Acute effects of vibration exercise on the grip strength and physiological recovery from high-intensity intermittent grip exercise

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Abstract

Purpose: The purpose of this study was to investigate the physiological effects of the vibration exercise during the recovery phase after high-intensity intermittent grip exercise.

Methods: Twelve female colleges voluntarily participated in this repeated measured and randomly crossover experiment. After maximum voluntary intermittent grip test (5 × reps, 9 1-min rest interval), all subjects were asked to immediately place their forearms on the BodyGreen vibration platform to perform the non-vibration (5 min, 0 Hz, 0 mm) or low-frequency vibration (5 min, 12 Hz, ± 3 mm) treatments. Immediately after the treatments, each subject was requested to perform 1 set of maximum voluntary grip test (6th set) again to clarify the acute recovery effects of vibration. The blood lactate concentrations and ratings of perceived exertion (RPE) were measured throughout the experiment. The peak force, mean force and percent fatigue at each set of maximum voluntary grip test were also analyzed by grip dynamometer.

Results: There were no significant differences on the peak force, mean force and percent fatigue in the 6 sets of grip test between two treatments. However, the RPE (vibration vs. non-vibration, 13.6 ± 2.1 vs. 14.3 ± 2.1, $p < .05$) and lactate increase ratio (vibration vs. on-vibration, 125.8 ± 31.1 vs. 161.3 ± 46.0 %, $p < .05$) at the 6th set of grip test in the vibration treatment were significantly lower than those in the non-vibration treatment.

Conclusions: These results indicated that the direct, local and low frequency vibration exercise could not improve the grip performance immediately after the high-intensity intermittent grip exercise, however, could ameliorate the perception of fatigue and the metabolic stress.

Key words: direct vibration, lactate, low frequency vibration, mechanical massage